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Integrated Dual Degree (B.Tech and M.Tech)
Sub_Code: RCI4C002

4thSemester Regular/Back Examination: 2023-24
SUBJECT:TRANSPORTATION ENGINEERING
BRANCH(S): C&EE,CIVIL,CE
Time: 3 Hour
Max Marks: 100
Q.Code: P327
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.(IRC:37 and IRC:58 design code are not allowed inside the exam hall)
The figures in the right hand margin indicate marks.

Part-I

Q1	**Answer the following questions:**	**(2 x 10)**
a)	What are the classifications of road in urban area?	
b)	Define reconnaissance survey.	
c)	What are the factors on which over taking sight distance depends?	
d)	Differentiate between ruling gradient and minimum gradient.	
e)	Why 75% of design speed is taken for design of superelevation? What do you mean by equilibrium superelevation.	
f)	Differentiate between Basic capacity and Practical capacity.	
g)	Define Thirtieth highest design hourly volume.	
h)	What are the different stresses develop in flexible pavement?	
i)	Define Perpetual Pavement.	
j)	What is frost heaving in flexible pavement failure?	

Part-II

Q2	**Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**	**(6 × 8)**
a)	What are the salient features of second twenty years road plan?	
b)	Discuss briefly the special care to be taken while aligning hill road.	
c)	Calculate the safe passing sight distance for a four lane two-way NH. The speed of overtaking vehicle is 80 kmph and acceleration of overtaking vehicle is 0.89 m/sec^2. Assume any other data as per IRC.	
d)	Derive an expression for finding the Superelevation required on horizontal curve.	
e)	A valley curve is formed by descending gradient of 1 in 35 which meets an ascending gradient of 1 in 25. Design the total length of valley curve if the design speed is 25 m/sec so as to fulfill both comfort condition and head light sight distance. Allowable rate of change of centrifugal acceleration is 0.6 m/sec^3, beam angle is 1^0 and height of the head light above carriageway is 0.91 m. Assume any other data as per IRC.	

f) Design the length of transition curve for a two lane two-way NH having design speed 65 Kmph and radius of circular curve is 300 m. Allowable rate of introduction of superelevation is 1in 150. Pavement rotated about centre line. Assume any other data as per IRC.

g) Briefly explain the crushing test of road aggregate.

h) Explain the relationship between speed, travel time, volume, density, and capacity.

i) Briefly explain the floating car method for speed and delay study.

j) What are the various factors to be considered in pavement design?

k) What are the different layers of flexible pavement? Explain the significance of each.

l) Explain how the filter material is designed for use in sub-surface drainage system.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Enumerate the different methods of carrying out traffic volume studies. Indicate the principle of each. **(16)**

Q4 Briefly explain the step by step procedure for design of flexible pavement as per IRC:37-2012 **(16)**

Q5 Explain the various types of failures in Rigid pavements and their causes. **(16)**

Q6 Specify the materials required and specifications for construction of WBM roads. Write down the construction steps for WBM road. **(16)**